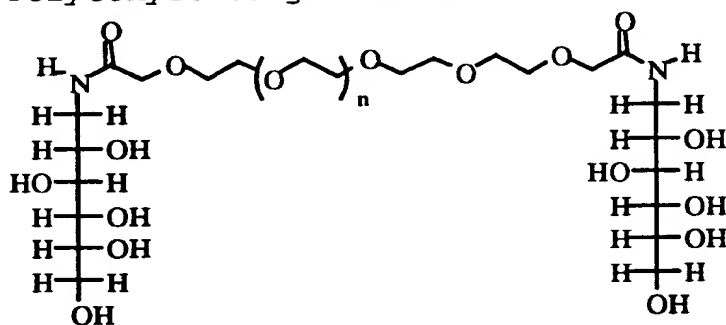


Appendix 1. List of abbreviations.

	.A	Acrolein
5	AA	Adipic acid
	BA	Boric acid
10	BNH ₂	$\text{CH}_3\text{CH}(\text{NH}_2)\text{CH}_2 - [\text{OCH}(\text{CH}_3)\text{CH}_2]_1 - [\text{OCH}_2\text{CH}_2]_m - [\text{OCH}_2\text{CH}(\text{CH}_3)]_n - \text{NH}_2$
	B2P	2- ^t Butylphenol
	B4P	4- ^t Butylphenol
15	DAP	1,5-Diaminopentane
	DEA	Diethanolamine
20	DEC	Diethylcarbonate
	DEM	Dimethylmalonate
	DEO	Diethyloxalate
25	DIT	Diisopropyl-D-tartrate
	DMM	Dimethylmaleate
30	EA	Ethanolamine
	EDA	Ethylene-1,2-diamine or 1,2-diaminoethane
	EG	Ethylene glycol
35	EPP	1,2-Epoxy-3-phenoxypropane
	FS	37 % w/v Formaldehyde solution
40	GA	50% w/v Glutaric aldehyde solution
	HQ	Hydroquinone
	MA	Methyl acrylate
45	OA	Oxalic acid
	P	Phenol
50	PA	2-Acetylpyridine
	PC	2-Pyridinecarboxaldehyde

PO Propylene oxide

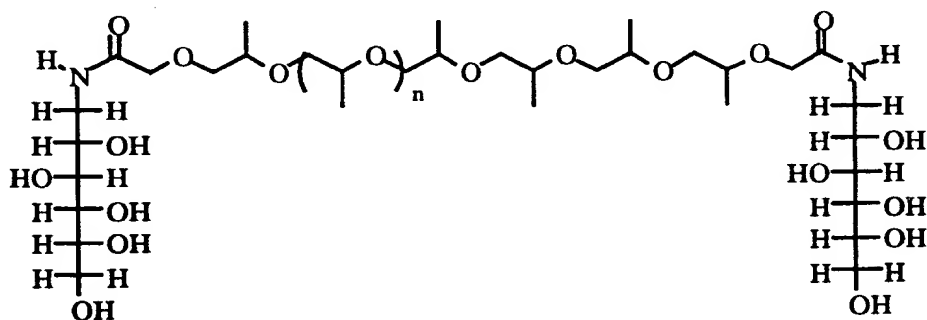
PEDG Polyethylenediglucamide



5

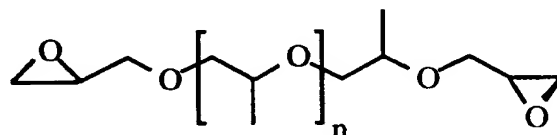
PPD 1,2 Propanediol

PPDG Polypropylenediglucamide

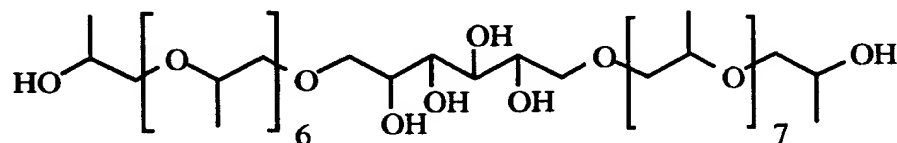


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PPDGE



PEG



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Appendix 2.

Table 1 (Properties of clay nanocomposite materials synthesized)

Film	Intercalator	Cross-linker	pH	d-spacing (Å)	Film Stability		Film Condition		
					Exfoliates	Stable	Brittle	Flexible	Hard or Soft
1	BNH ₂	FS	na	14.0		Yes		Yes	Hard
2	BNH ₂	MA/H ₂ O ₂	na	-	Yes		Yes		Hard
3	BNH ₂ /PEG	-	na	-		Yes	Yes		Hard
4	PEG	MA	na	-	Yes				Soft
5	PEG	MA/H ₂ O ₂	na	-	Yes				Soft
6	PEG	BA	na	-	Yes				
7	EDA	FS	na	14.4		Yes		Very	Hard
8	FS	Catalytic H ₂ O ₂	na	-	Yes	Yes	Yes		Hard
9	EDA	PPDGE	6	-		Yes	Yes	Some	
10	EDA	EPP	6	15.6		Yes		Yes	Hard
11	EDA	PO	6	-		Yes		Yes	
12*	EDA	A	na	-					
13	BNH ₂	PPDGE	6	-	Yes	Yes	Yes		Hard
14	BNH ₂	EPP	6.4	-		Yes		Yes	Hard
15	BNH ₂	PO	6.6	-		Yes	Yes	Some	Hard
16B	4PEG:1BNH ₂	EPP	4	17.3		Yes		Yes	Hard
17	4PEG:1EDA	EPP	5	17.7		Yes	Slightly	Yes	Hard
18	PEG	EPP	na	-	Yes				Soft
19	PEG	PO	na	-	Yes				Soft
20	-	Styrene/H ₂ O ₂	na	-	Yes				Soft
21	PEG	EPP/H ₂ O ₂	na	-	Yes				Soft
22	PEG	PO/H ₂ O ₂	na	-					Soft
23	DAP	FS	na	-		Yes	Yes		Hard
24	DAP	-	na	-		Yes		Yes	Hard
25	DAP	EPP	6.5	18.6		Yes	Slightly		Hard
26	DAP	PO	6.5	-		Yes	Yes		
27	DAP	PO/EPP	na	17.2		Yes	Yes		Hard
28	EDA	PPDGE	2	14.1		Yes		Yes	Hard
29	BNH ₂	PPDGE	2	15.9		Yes	Yes		Hard
30	PEG	PPDGE	2	17.5		Yes		Yes	Soft
31	PEG	PO	2	16.5	Yes	Yes			Soft

Table 1 (continued)

Film	Intercalator	Cross-linker	pH	d-spacing (Å)	Film Stability		Film Condition		
					Exfoliates	Stable	Brittle	Flexible	Hard or Soft
32	PEG	EPP	2	16.8	Yes	Yes			Soft
33	EDA	A	na	15.1		Yes		Yes	Hard
34	EDA	PC	na	17.7		Yes		Yes	Hard
35	EDA	PA	na	15.1		Yes			Hard
36*	EDA	AA	6	12.7		Yes		Yes	Hard
37	EDA	AA	na	15.0		Yes		Very	Hard
38*	EDA	AA	2	13.0		Yes		Yes	Hard
39*	EDA	OA	6	15.5		Yes	Yes	Slightly	Hard
40	EDA	OA	na	15.1		Yes		Very	Hard
41*	EDA	OA	2	15.6		Yes		Yes	Hard
42	EDA	GA	na	15.5		Yes		Yes	Hard
43	BNH ₂	GA	na	-∞	Yes	Yes		Yes	
44	PEDG	PO	6	-	Yes				
45	PEDG	EPP	6	-	Yes				
46	PEDG	PDGE	6	-	Yes				
47	PPDG	PO	6	-	Yes				
48	PPDG	EPP	6	-	Yes				
49	PPDG	PDGE	6	-	Yes				
50	EDA	DEC	na	-		Yes		Very	Hard
51	BNH ₂	DEC	na	-		Yes	Yes		Hard
52	DAP	DEC	na	-		Yes		Very	Hard
53	EA	DEC	na	-		Yes		Yes	Hard
54	DEA	DEC	na	-		⊥			Soft
55	EG	DEM	na	-	Yes	⊥			Soft
56	EG	DMM	na	-	Yes	⊥			Soft
57	EG	DIT	na	-	Yes	Yes		Yes	
58	EG	DEO	na	-	Yes	Yes⊥		Yes	
59	PPD	DEM	na	-	Yes				Soft
60	PPD	DMM	na	-	Yes	⊥			Soft
61	PPD	DIT	na	-		Yes		Yes	
62	PPD	DEO	na	-	Yes	⊥			Soft
63	HQ	FS	na	-		Yes		Yes	Hard
64	P	FS	na	-	Some	Yes		Yes	Hard

65	B4P	FS	na	-		Yes		Yes	Hard
66	B2P	FS	na	-	Yes	Yes	Slightly	Yes	Hard

+ film 12 resulted in polymerisation of the intercalator solution on addition of the acrolein

* considerable precipitation of intercalator/cross-linker complex

ω although film 43 is stable no d-spacing was measured due to the non-homogeneous nature of the treated film

⊥ All these films decompose upon overnight soaking in fresh water